



Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11) **EP 1 329 663 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention  
of the grant of the patent:  
**28.12.2005 Bulletin 2005/52**

(51) Int Cl.7: **F21S 4/00, F21S 8/00**

(21) Application number: **03075186.1**

(22) Date of filing: **20.01.2003**

(54) **Device for radiating light**

Vorrichtung zur Ausstrahlung von Licht

Dispositif d'émission de lumière

(84) Designated Contracting States:  
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR  
HU IE IT LI LU MC NL PT SE SI SK TR**

(30) Priority: **18.01.2002 NL 1019778**

(43) Date of publication of application:  
**23.07.2003 Bulletin 2003/30**

(73) Proprietor: **Fibrallight B.V.  
3646 AH Waverveen (NL)**

(72) Inventor: **Homan, Petrus Josephus  
3646 AH Waverveen (NL)**

(74) Representative:  
**Ledeboer, Bernard Christiaan et al  
Vereenigde,  
Postbus 87930  
2508 DH Den Haag (NL)**

(56) References cited:  
**DE-A- 3 530 671 DE-U- 29 808 536  
FR-A- 2 811 063 US-A- 4 581 687**

**EP 1 329 663 B1**

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

## Description

**[0001]** The present invention relates to a device for radiating light in the form of long strings with light sources which realize an attractive, decorative effect. Devices with such a decorative effect are already known. However, due to the plurality of light sources, such devices use a great deal of energy.

**[0002]** In order to obviate this drawback, the present invention provides a device for radiating light, comprising:

- a frame with a predetermined decorative shape,
- a substantially tube-like casing, comprising:
- a relatively large number of light sources arranged in the interior of the casing,
- conducting means for connecting the light sources in electrically conducting manner, wherein the conducting means are arranged in the interior of the casing, wherein
- the casing is arranged on the frame in accordance with a predetermined shape.

**[0003]** The light sources are preferably LEDs. The energy consumption is hereby reduced. As a light source LEDs further have a very great robustness and a long lifespan of up to for instance 20 years. The devices hereby acquire a high reliability during use. A further advantage of the use of LEDs is that these are safer in use, for instance because the heat development is much lower. The use of LEDs in such devices further becomes attractive in that different colours of LED have recently become available.

**[0004]** Patent publication FR 2 811063 discloses a lighting device comprising a bracket for carrying a light tube with conventional light bulbs. Switching means are located outside the light tube. Patent application US 4 681 687 discloses an ornamental light device with tubular light structures comprising mini-lamps for indoor decorative purposes. No switching means are disclosed in US 4 581 687. Patent publication DE 198 08 536 discloses a light tube with LED's embedded therein. Again, no switching means are disclosed.

**[0005]** In addition, the light sources are preferably connected in groups. A voltage source having a higher voltage than required per light source can for instance hereby be applied.

**[0006]** In a further preferred embodiment the light sources are positioned in the casing at a mutual distance of for instance 1-15 centimetres. Placing of light sources at such distances produces an effect of continuity to a series of light sources in such a casing.

**[0007]** An above described device can have a length of up to for instance 250 metres. The making of large decorations illuminated using the device hereby becomes very simple, since very few connecting points are necessary.

**[0008]** In a further preferred embodiment the device

further comprises switching means for switching separate light sources or groups of light sources. Separate light sources or groups of light sources can hereby be switched on or off, whereby motion-simulating effects can for instance be achieved by means of the light sources placed in the device.

**[0009]** In the field of street decoration with which public spaces are decorated for instance during (and/or prior to) holiday periods, decorations are known in which traditional light bulbs are applied. Such decorations have the drawback that the lighting thereof is very static, since the placing of the light bulbs is determined for instance by the fixed position of the fittings therefor.

**[0010]** In order to obviate such drawbacks, a further aspect of the present invention provides decorations for decorative lighting of (public) spaces, comprising:

- a frame with a predetermined decorative shape,
- fixing means for fixing the frame to at least a ground or facade of the (public) space,
- at least one device according to one or more of claims 1-9 for radiating light, wherein this device is arranged along the frame, wherein the decorative shape of the frame is emphasized in that the lights are arranged therealong.

**[0011]** Such a decoration has the advantage that ornamental lighting can be arranged on the decorations in very simple and/or flexible, changeable manner. In such an application this ornamental lighting has the same advantages as described in the foregoing.

**[0012]** In order to provide a large measure of durability, the frame comprises a metal construction. Such decorations can be used more than once owing to their solid nature.

**[0013]** Further advantages, features and details of the present invention are further explained hereinbelow with reference to the figures, in which:

- fig. 1 shows a cross-section of an embodiment according to the present invention,
- fig. 2 is a perspective view of three further embodiments according to the present invention.

**[0014]** An embodiment according to the present invention (fig. 1) shows a part of a substantially tube-like decorative device 1. The decorative device comprises a casing 2 which is substantially tube-like. Two conducting wires 3,4 are arranged herein for supplying electricity. Between these electrical wires are arranged wires 7 which switch one or more LEDs (in the present case 6). Further connected herein are switching means 6 which can comprise electrical components, including for instance resistors or a processing unit.

**[0015]** An object of such switching means 6 is that flashing or motion effects can be realized using the number of light sources positioned in the casing. The operation of such switching means can be controlled

from a central control member (not shown) which forms part of the device and which can for instance be arranged at the position of the coupling of the tube to an external power source. A suitable pulse coding can then be applied to control the switching means, these pulses being supplied via wiring 3,4,7.

**[0016]** A switching group of 6 LEDs is described and shown in the foregoing. Further assemblies of connections are for instance 12 LEDs per switching group, 18 LEDs per switching group or 36 LEDs per switching group, although any practical number can be applied depending on for instance manufacture or applied voltage. Such tubes can for instance be produced in a length of about 30m, 60m, 90m or 180 metres respectively.

**[0017]** In groups of 18 an LED for applying can for instance use 0.02 A at 120V, whereby this group has a power of 2.4 Watts. In this case a tube with 360 LEDs and 20 groups uses only 48 Watts of energy.

**[0018]** According to a further aspect of the invention, the above described tube-like decoration or LED tube is applied in ornaments wherein use is traditionally made of light bulbs. Such ornaments are for instance used for lighting public spaces. Ornaments are also used to decorate homes, wherein relatively smaller light bulbs are then applied.

**[0019]** Figure 2 shows three examples of (outdoor) ornaments on which can be arranged the tube-like light decoration as described above. These examples are not however limitative for the application of the tube-like decoration. Such decorations can take a very solid form for multiple use year after year and in simple manner can obtain a different surprising or attractive appearance using the tube-like decoration.

**[0020]** Figure 2 shows three embodiments 14, 15 and 16 according to the present invention. Embodiment 14 shows a street-spanning decoration for fixing to a steel cable. Such decorations are often applied above for instance shopping streets during festive periods. Another embodiment 15 relates to a lighting decoration which is especially suitable for fixing to vertical walls. In addition to use in shopping streets, such decorations can also be applied anywhere where vertical walls are available. The same is true for embodiment 16, which is particularly suitable for fixing to a post. Such self-supporting constructions can be placed anywhere where posts can be placed.

**[0021]** The street-spanning decoration 14 can be fixed in the usual manner between two facades, suspended on for instance a steel cable using suspension eyes.

**[0022]** The decorations according to embodiments 14, 15 and 16 are very solid decorations with frames which can be used year after year as street decoration or decoration of for instance large shopping centres. Such frames have already been applied for a long time by applicant, wherein the frames are provided with large quantities of light bulbs. The energy consumption of these decorations is hereby very high. The use of tubes

with LEDs can greatly reduce this energy use, while lighting effects can be achieved which have an attention value differing from those achieved with the known light bulbs.

## Claims

1. Device for radiating light, comprising:

- a frame with a predetermined decorative shape,
- a substantially tube-like casing, comprising:
  - a relatively large number of light sources arranged in the interior of the casing,
  - conducting means for connecting the light sources in electrically conducting manner, wherein the conducting means are arranged in the interior of the casing, wherein
  - the casing is arranged on the frame in accordance with a predetermined shape,

wherein the light sources are LED's, wherein the conducting means comprise common energy supply wires (3,4) and interconnection wires (7), each of the interconnection wires (7) interconnecting a separate light source or group of light sources (5) to the common energy supply wires (3,4) and comprising switching means comprising an electric component (6) in said interconnection wires (7), within the casing, for the separate light source or the group of light sources (5).

2. Device as claimed in claim 1, wherein the light sources are connected in groups.

3. Device as claimed in any of the preceding claims, wherein the switching means are arranged in series with a light source.

4. Device as claimed in one or more of the foregoing claims, wherein the light sources are positioned in the casing at a mutual distance of 1-15 centimetres.

5. Device as claimed in one or more of the foregoing claims, wherein the light sources are ordered in groups of 4-40 light sources.

6. Device as claimed in one or more of the foregoing claims, wherein the casing has a length of 1-250 metres.

7. Device as claimed in one or more of the foregoing claims, comprising light sources radiating different colours of light.

8. Device as claimed in one or more of the foregoing

claims, wherein the switching means are arranged for switching separate light sources.

9. Device as claimed in one or more of the foregoing claims, wherein the switching means are arranged for switching groups of light sources. 5

10. Device as claimed in one or more of the foregoing claims, wherein the tube-like casing is at least partially light-transmitting. 10

11. Decoration for decorative lighting of (public) spaces, comprising:

- a device as claimed in one or more of the claims 1-10, 15
- fixing means for fixing the frame to at least a ground or facade of the (public) space, wherein:
- the decorative shape of the frame is emphasized in that the casing is arranged thereon. 20

12. Decoration as claimed in claim 11, wherein the frame comprises a metal construction.

13. Decoration as claimed in claim 11 or 12, wherein the frame is a spanning construction for fixing between two facades. 25

14. Decoration as claimed in one or more of the claims 11-13, wherein the frame is provided with fixing means for suspension from a cable stretched between two facades. 30

15. Decoration as claimed in one or more of the claims 11-13, wherein the frame comprises a vertical part for fixing to or placing on a substantially horizontal ground. 35

16. Decoration as claimed in one or more of the claims 11-13, wherein the frame comprises a substantially horizontal part for fixing to an facade. 40

17. Decoration as claimed in claim 16, wherein the horizontal part comprises wall fastening means. 45

#### Patentansprüche

1. Vorrichtung zur Ausstrahlung von Licht, die umfasst: 50

- einen Rahmen mit einer vorbestimmten dekorativen Form, und
- einen im Wesentlichen schlauchartiger Mantel, der umfasst: 55
- eine relativ große Anzahl von Lichtquellen, die im Inneren des Mantels angeordnet sind,
- leitende Mittel zum Verbinden der Lichtquellen

in elektrisch leitender Weise, wobei die leitenden Mittel im Inneren des Mantels angeordnet sind, wobei

- der Mantel auf dem Rahmen in Übereinstimmung mit einer vorbestimmten Form angeordnet ist,

wobei die Lichtquellen LED's sind, wobei die leitenden Mittel gemeinsame Energieversorgungsdrähte (3, 4) und Verbindungsdrähte (7) umfassen, und jeder der Verbindungsdrähte (7) eine einzelne Lichtquelle oder Gruppe von Lichtquellen (5) mit den gemeinsamen Energieversorgungsdrähten (3, 4) verbindet und Schaltmittel aufweist, die ein elektrisches Bauteil (6) in den Verbindungsdrähten (7) innerhalb des Mantels für die einzelne Lichtquelle oder die Gruppe von Lichtquellen (5) aufweisen.

2. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Lichtquellen in Gruppen verbunden sind.

3. Vorrichtung nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Schaltmittel in Reihe mit einer Lichtquelle angeordnet sind.

4. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Lichtquellen in dem Mantel in einem Abstand von 1-15 Zentimetern zueinander positioniert sind.

5. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Lichtquellen in Gruppen von 4-40 Lichtquellen angeordnet sind.

6. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der Mantel eine Länge von 1-250 Metern hat.

7. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche, die Lichtquellen umfasst, die verschiedene Lichtfarben ausstrahlen.

8. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Schaltmittel zum Schalten einzelner Lichtquellen angeordnet sind.

9. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Schaltmittel zum Schalten von Gruppen von Lichtquellen angeordnet sind.

10. Vorrichtung nach einem oder mehreren der vorher-

gehenden Ansprüche, **dadurch gekennzeichnet, dass** der schlauchartige Mantel mindestens teilweise lichtdurchlässig ist.

11. Dekoration für dekorative Beleuchtung von (öffentlichen) Plätzen, die umfasst: 5
- eine Vorrichtung nach einem oder mehreren der Ansprüche 1-10,
  - Befestigungsmittel zum Befestigen des Rahmens an mindestens einem Untergrund oder einer Fassade des (öffentlichen) Platzes, **dadurch gekennzeichnet, dass:** 10
  - die dekorative Form des Rahmens **dadurch** betont wird, dass der Mantel darauf angeordnet ist. 15
12. Dekoration nach Anspruch 11, **dadurch gekennzeichnet, dass** der Rahmen eine Metallkonstruktion aufweist. 20
13. Dekoration nach Anspruch 11 oder 12, **dadurch gekennzeichnet, dass** der Rahmen eine überspannende Konstruktion zum Befestigen zwischen zwei Fassaden ist. 25
14. Dekoration nach einem oder mehreren der Ansprüche 11 - 13, **dadurch gekennzeichnet, dass** der Rahmen mit Befestigungsmitteln zum Aufhängen an einem Kabel, das zwischen zwei Fassaden gespannt ist, versehen ist. 30
15. Dekoration nach einem oder mehreren der Ansprüche 11 - 13, **dadurch gekennzeichnet, dass** der Rahmen ein vertikales Teil zum Befestigen an oder Platzieren auf einem im Wesentlichen horizontalen Untergrund umfasst. 35
16. Dekoration nach einem oder mehreren der Ansprüche 11 - 13, **dadurch gekennzeichnet, dass** der Rahmen ein im Wesentlichen horizontales Teil zum Befestigen an einer Fassade umfasst. 40
17. Dekoration nach Anspruch 16, **dadurch gekennzeichnet, dass** das horizontale Teil Wandbefestigungsmittel aufweist. 45

## Revendications 50

1. Dispositif de rayonnement lumineux, comprenant :
- une structure présentant une forme décorative prédéterminée, 55
  - une enveloppe sensiblement en forme de tube, comprenant :
  - un nombre relativement important de sources

lumineuses agencées à l'intérieur de l'enveloppe,

- un moyen de conduction destiné à relier les sources lumineuses d'une manière électriquement conductrice, où le moyen de conduction est placé à l'intérieur de l'enveloppe, dans lequel
- l'enveloppe est placée sur la structure conformément à une forme prédéterminée,

où les sources lumineuses sont des diodes électroluminescentes (LED),

où le moyen de conduction comprend des câbles d'alimentation d'énergie communs (3, 4) et des câbles d'interconnexion (7), chacun des câbles d'interconnexion (7) interconnectant une source lumineuse séparée ou un groupe de sources lumineuses séparées (5) aux câbles d'alimentation d'énergie communs (3, 4) et comprenant un moyen de commutation contenant un composant électrique (6) dans lesdits câbles d'interconnexion (7) à l'intérieur de l'enveloppe, pour la source lumineuse séparée ou le groupe de sources lumineuses séparées (5).

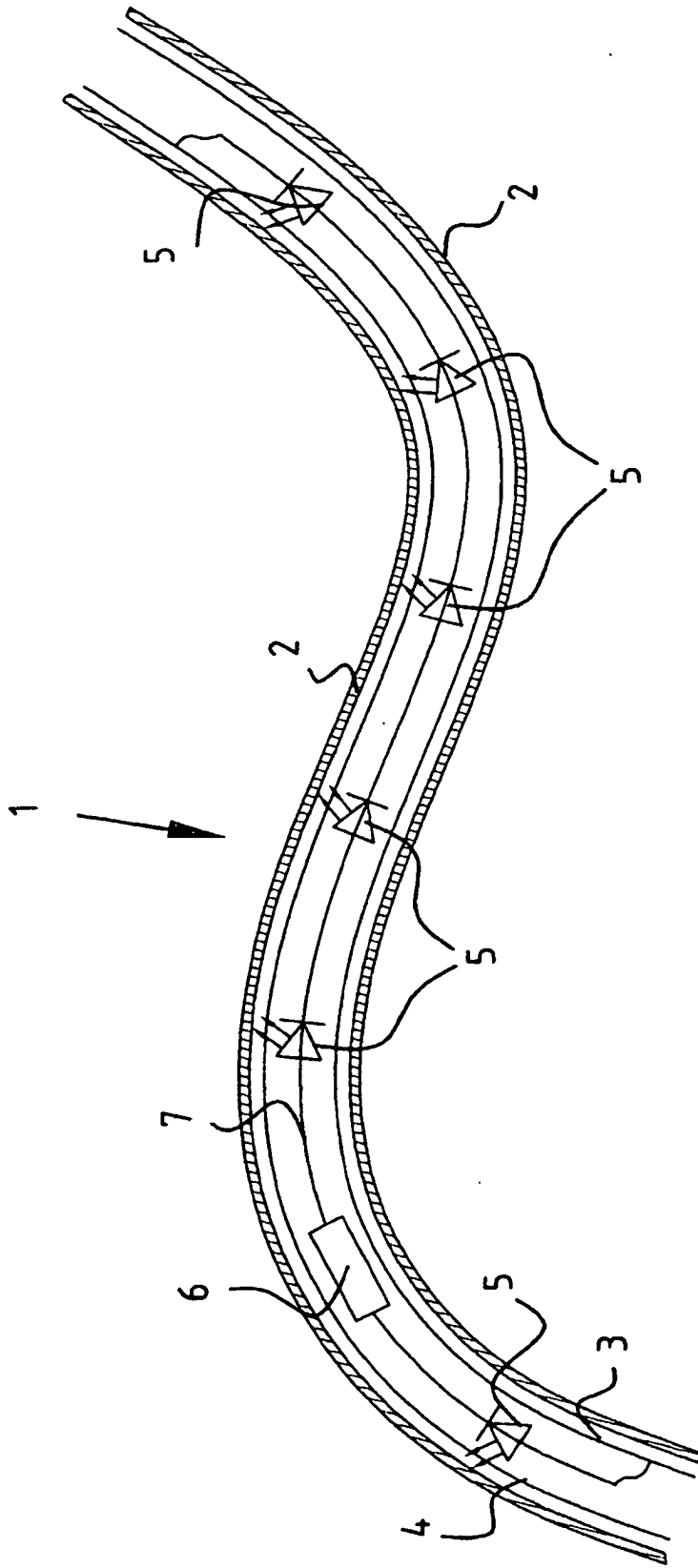
2. Dispositif selon la revendication 1, dans lequel les sources lumineuses sont reliées par groupes.
3. Dispositif selon l'une quelconque des revendications précédentes, dans lequel le moyen de commutation est placé en série avec une source lumineuse.
4. Dispositif selon une ou plusieurs des revendications précédentes, dans lequel les sources lumineuses sont positionnées dans l'enveloppe à une distance mutuelle de 1 à 15 centimètres.
5. Dispositif selon une ou plusieurs des revendications précédentes, dans lequel les sources lumineuses sont rangées en groupes de 4 à 40 sources lumineuses.
6. Dispositif selon une ou plusieurs des revendications précédentes, dans lequel l'enveloppe a une longueur de 1 à 250 mètres.
7. Dispositif selon une ou plusieurs des revendications précédentes, comprenant des sources lumineuses rayonnant différentes couleurs de lumière.
8. Dispositif selon une ou plusieurs des revendications précédentes, dans lequel le moyen de commutation est agencé pour commuter des sources lumineuses séparées.
9. Dispositif selon une ou plusieurs des revendications précédentes, dans lequel le moyen de com-

mutation est agencé pour commuter des groupes de sources lumineuses.

- 10.** Dispositif selon une ou plusieurs des revendications précédentes, dans lequel l'enveloppe en forme de tube transmet au moins partiellement la lumière. 5
- 11.** Élément de décoration destiné à illuminer de façon décorative des espaces (publics), comprenant : 10
- un dispositif selon une ou plusieurs des revendications 1 à 10,
  - un moyen de fixation destiné à fixer la structure à au moins un sol ou une façade de l'espace (public), où : 15
  - la forme décorative de la structure est mise en valeur en ce que l'enveloppe est agencée sur celle-ci. 20
- 12.** Élément de décoration selon la revendication 11, dans lequel la structure comprend une construction métallique. 25
- 13.** Élément de décoration selon la revendication 11 ou 12, dans lequel la structure est une construction à portée destinée à une fixation entre deux façades.
- 14.** Élément de décoration selon une ou plusieurs des revendications 11 à 13, dans lequel la structure est munie d'un moyen de fixation destiné à une suspension depuis un câble tendu entre deux façades. 30
- 15.** Élément de décoration selon une ou plusieurs des revendications 11 à 13, dans lequel la structure comprend une partie verticale destinée à une fixation ou au positionnement sur un sol pratiquement horizontal. 35
- 16.** Élément de décoration selon une ou plusieurs des revendications 1 à 13, dans lequel la structure comprend une partie pratiquement horizontale destinée à être fixée à une façade. 40
- 17.** Élément de décoration selon la revendication 16, dans lequel la partie horizontale comprend un moyen de fixation au mur. 45

50

55



**FIG. 1**

